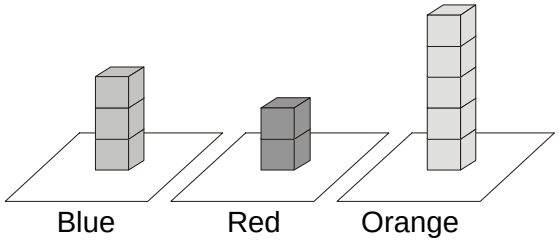
DATA AND PROBABILITY

Grade K

BIG IDEA (1): Formulate questions that can be addressed with data and collect, organize and display data to answer them

CONCEPT	EXPECTATION	EXAMPLE
A Formulate questions	Pose questions and gather data about themselves and their surroundings	Students should be able to answer questions about simple pictographs (graphs that use pictures or symbols to represent data) or bar "graphs" constructed of objects or pictures brought from home or found in the classroom. Problem: Display the following, and ask students: 1. How many orange cubes are there in the orange stack? 2. Are there more orange or red cubes? How do you know?  Answers: 1. Five. 2. Orange. I counted them, and there were five orange and only two red; or, I looked at the stacks and the orange stack was taller than the red stack.

CONCEPT	EXPECTATION	EXAMPLE

Problem:
Have students work with a partner to make the longest possible chain from rectangular strips of paper measuring 1 by 8 inches each during a specified amount of time. When they are finished, display all the chains, and ask questions such as the following:

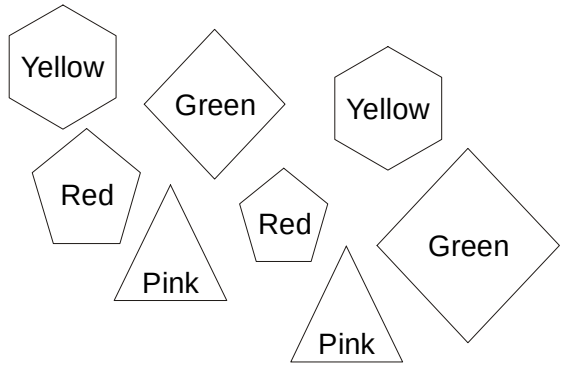
1. Which chain has the fewest links? How many links are in the chain?
2. How many links are in the shortest chain?

Problem:
Give each student a strip of paper with pictures of four animals (dog, cat, fish, bird) on it, and ask each student to pick his or her favorite animal out of the group. After making their selection, students should cut out the selected animal's picture. Explain to students that they are going to help you record their selections on a tally chart to help decide which animal is the most favorite in the class. Display the tally chart, and have each student, one by one, hold up a picture of his or her favorite animal. The class names the animal in the picture as you mark a tally on the chart for that animal. Demonstrate to students how to make a fifth tally mark by drawing a horizontal mark across the four vertical marks.

Our Class's Favorite Animal

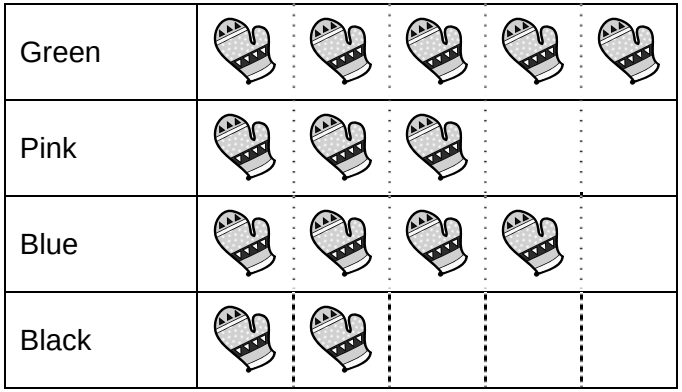
Animal	Tally of Animals
Dog	𝍸 ||
Cat	𝍸 ||||
Bird	|
Fish	|||

CONCEPT	EXPECTATION	EXAMPLE
		TEACHER NOTES: Students should be able to answer teacher-directed questions and formulate questions about their classroom and home. Students should also formulate and answer questions relating to “greater than” and “less than.”

CONCEPT	EXPECTATION	EXAMPLE
B Classify and organize data	Sort items according to their attributes	Given a set of objects, students should be able to sort/organize/classify them into two to three groups and identify their common attributes. Problem: Display the following shapes, and ask students to help you sort them. Ask them about different ways that you could sort the shapes (number of sides, color, large, small, etc.).  TEACHER NOTES: Students should be able to articulate the common attributes of a given set of objects. Students should be challenged to reorganize the same set of objects by different attributes.

DEFINITION:
attribute—a characteristic or distinctive feature—such as shape, size, color—of an object or given set of objects.[1]

[1] Eather, J. A. *A math dictionary for kids.* Retrieved June 5, 2004, from www.amathsdictionaryforkids.com.

CONCEPT	EXPECTATION	EXAMPLE
C Represent and interpret data	Represent data using physical objects	Students should be able to help with the construction of a graph, create labels for the graph, and answer simple counting questions. Students should also answer teacher-directed questions relating to “greater than” and “less than.” Problem: Display the following, and explain to students that the mittens, which belong to some kindergarten students, have been sorted. Explain that each glove represents one pair of mittens.  Ask them the following questions about the display: 1. How have the mittens been sorted? 2. What label could we put on this display? 3. Which color of mittens do most kindergarten students wear? 4. How many more pairs of blue mittens are there than pink? 5. What color of mittens do the least number of kindergarten students wear? How do you know?

CONCEPT	EXPECTATION	EXAMPLE
		Answers: 1. By color 2. Kindergarten Mittens, etc. 3. Green 4. One 5. Black. I counted them, and there were only two, which is the smallest number; or, I could tell by looking that it has the least number of mittens shown. TEACHER NOTES: "Students learn through multiple experiences. How data are gathered and organized depends on the question they are trying to answer. For example, when students are asked to put a counter into a bowl to indicate whether they vote for a class trip to the zoo or to the museum, the responses are organized as the data are gathered. To address a particular question such as "What is your favorite beverage served in the school cafeteria?" real objects such as containers for chocolate milk, plain milk, or juice can be collected, organized, and displayed. At other times, pictures of objects, counters, name cards, or tallies can be contributed by students, organized, and then displayed to indicate preferences."[2]

[2] National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics* (p. 110). Reston, VA: Author.